Arizona Regional Haze: 2022 Potential Nonpoint Rules

Bruce Friedl and Alex Ponikvar, ADEQ

ADEQ Arizona Department of Environmental Quality

Agenda

- Background and Review of the Nonpoint Source Evaluation Process for Regional Haze
  - Significantly Contributing PM Species
  - Nonpoint Source Screening
  - Emissions Control Areas
  - Control Analysis and Results
- Nonpoint Strawman Rules
- Timeline and Next Steps
- Questions and Comments
- Contacts

Background

The Federal Regional Haze program requires periodic evaluation of viable controls for emissions that significantly impact visibility in important protected natural areas called Federal Class I areas

Planning for the 2022 RH State Implementation Plan (SIP) included evaluation of potential measures to reduce emissions from both point and nonpoint sources, in accordance with 40 CFR 51.308(f)(2)(i) of the Federal Regional Haze Rule

Background

- ADEQ completed a control analysis of nonpoint sources as required under the Federal Regional Haze Rule and selected four control options as both technically feasible and generally cost-effective

- The following slides walk through the analysis ADEQ performed to select the most feasible and cost-effective nonpoint emissions reduction measures that are necessary to make reasonable progress toward the national visibility goal pursuant to 40 CFR 51.308(f)(2)(i)

Background - Significantly Contributing PM Species

- First Step: Screen out particulate matter (PM) species that make only a small contribution to overall anthropogenic light extinction at Arizona Federal Class I areas
  - Evaluated the impacts of particulate species on the 20% most anthropogenically impaired days
  - Species evaluated: ammonium sulfate (sulfate), ammonium nitrate (nitrate), organic mass carbon (OMC), light absorbing carbon (LAC), [fine] soil, and coarse mass (CM)
  - Sulfate, nitrate, and coarse mass (i.e., PM10) account for 72% - 89% (average 80%) of anthropogenic light extinction in Arizona Federal Class I areas
    - Sulfate, nitrate, and coarse mass (PM10) were evaluated for source controls during this planning period

Background - Nonpoint Source Screening

- Next: Determine which nonpoint sources to include in the required control analysis
  - Used county-level nonpoint datasets from the National Emissions Inventory
  - Calculated total emissions of PM10-primary, nitrogen oxides (NOx), and sulfur dioxide (SO2) for each nonpoint emissions sector based on source classification code

Background - Nonpoint Source Screening

- Total Emissions by Nonpoint Source Sector (tons per year)

NOx	PM10	SO2	Total	Sector
18,045	541	11	18,597	Mobile - Locomotives
0	14,501	0	14,501	Dust - Paved Road Dust
0	107,924	0	107,924	Dust - Unpaved Road Dust
0	15,536	0	15,536	Dust - Industrial/Commercial/Institutional Construction Dust (Nonresidential)
0	44,753	0	44,753	Industrial Processes - Mining
13,912	0	0	13,912	Biogenics - Vegetation and Soil

Background - Nonpoint Source Screening

- Source sectors evaluated for PM10 controls
  - Mining and Quarrying
  - Paved and Unpaved Roads
  - Nonresidential Construction (Industrial, Commercial, Institutional)

- Locomotive and Biogenic NOx emissions were not considered in this planning period because these sectors are generally controlled at the federal level or are mostly uncontrollable

Background - Emissions Control Areas

- The Arizona Class I areas most impacted by “coarse mass”/PM10 visibility impairment are:*
  - Chiricahua National Monument and Wilderness Area,
  - Galiuro Wilderness Area,
  - Saguaro National Park, and
  - Superstition Wilderness Area

- Any potential new controls are proposed to apply to sources within a limited 50 km buffer zone in and around each of the “coarse mass” Class I areas, since PM10 does not generally experience high transport distances.** [map on next slide]

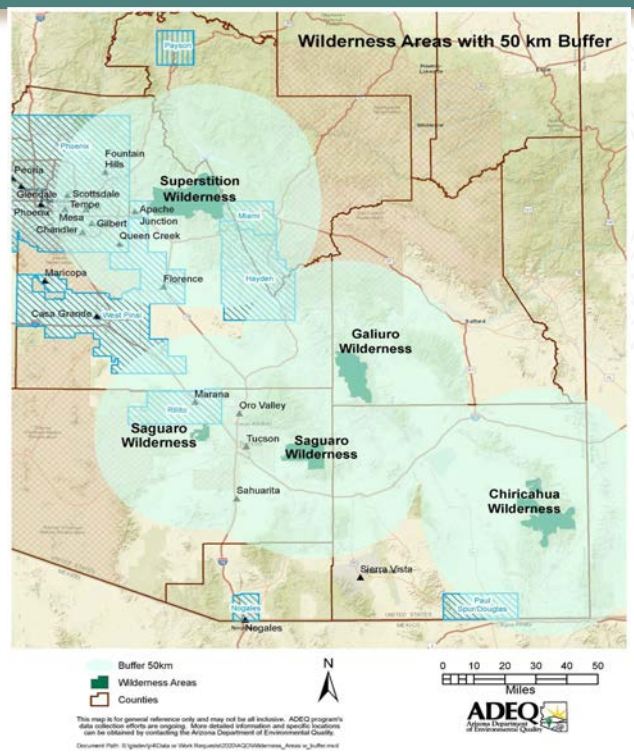
*Each of these Class I areas (and associated IMPROVE sites) exhibited coarse mass impacts on the most impaired days of > 10% of the total anthropogenic light extinction (Mm-1) during the 2013-2017 period. The remaining Class I areas in the state fell below this criterion or did not have complete data at the time of the evaluation and were excluded from control consideration.

**50 km buffer as measured from the boundary of each Class I area. Proposed control area includes the Class I area.

Applicability Areas

- Potential control rules will list the specific townships where the rules apply. Only townships that lie fully within the 50 km "buffer zone" will be included

- Areas with more stringent rules and tribal land would be exempt



Background - Four-Factor Analysis

- Control Analysis of more than 60 listed emissions reduction measures for
  - Mining and Quarrying
  - Paved and Unpaved Roads
  - Nonresidential Construction

- The statutory Four-Factors required for the regional haze reasonable progress control analysis are:
  1. Cost of compliance
  2. Time necessary for compliance
  3. Energy and non-air quality environmental impacts of compliance
  4. Remaining useful life of potentially affected sources

Background - Four-Factor Analysis

- Nonpoint Cost-Effectiveness Threshold
  - $5,000/ton (or less) of emissions reduction (to generally align with the median point source threshold)
- Four measures were selected as meeting the four factors required by the Regional Haze Rule
  - Two for paved roads
  - Two for nonresidential construction
- No measures were selected for the unpaved roads or mining and quarrying sectors
  - Candidate control measures were excluded based on technical infeasibility, not meeting one or more of the four statutory factors, or insufficient information to make a determination at this time

Background - Four-Factor Results: Nonresidential Construction

Available PM10 Control Measure	Technically Feasible	[1] Cost of Compliance		[2] Time Necessary for Compliance	[3] Energy and Non-AQ Environmental Impacts of Compliance	[4] Remaining Useful Life of Potentially Affected Sources
		Annualized Costs	Cost Effectiveness ($/ton)			
Apply chemical stabilizers/dust suppressants to unpaved parking and staging areas	Yes	$432/acre-year [Acrylic polymer]	$516/ton	TBD	Fuel to transport products. Cost to remove.	Construction activity is likely to occur indefinitely within the PM10 (coarse mass) Class I areas.
		$1,344/acre-year [Gravel]	$2,139/ton			
		$7,844/acre-year [Paving]	$4,820/ton			
Limit vehicle speed at work site	Yes	$96 per project	$2,526 /ton	TBD	Unknown	Construction activity is likely to occur indefinitely within the PM10 (coarse mass) Class I areas.
		$274 for four signs posted > 10 acres [Five years before reflectivity on signs begins to wear off.]	$4,717 /ton			

Background - Four-Factor Results: Paved Roads

Available PM10 Control Measurew	Technically Feasible	[1] Cost of Compliance		[2] Time Necessary for Compliance	[3] Energy and Non-AQ Environmental Impacts of Compliance	[4] Remaining Useful Life of Potentially Affected Sources
		Annualized Costs	Cost Effectiveness ($/ton)			
Stabilize access points where unpaved traffic surfaces adjoin paved roads	Yes	$1,187/access point [Aggregate coverage – annual control application.]	$5,058*	Begin February 1, 2023. Full compliance dependent on funding.	N/A	Construction and maintenance of public roadways is likely to occur indefinitely within the PM10 (coarse mass) Class I areas.
		$1,123/access point [Paving – 10-year control lifespan.]	$2,351			
		$98/access point [Chemical stabilization – semi-annual control application.]	$221			
Traffic rerouting, rapid cleanup (water erosion, track-out, material spills)	Yes	$1,081/spill	$3,614	Within 24 hours. (upon completion of rulemaking)	N/A	N/A

Strawman Rules

- Two Measures for Nonresidential Construction
  - Dust mitigation for parking and staging areas one or more acres
    - Gravel, chemical stabilizers, paving
  - Speed limits for worksites 10 or more acres
    - Post signs
- Notification before begin construction
  - ADEQ considering online portal for determining applicability and notification
- Would not apply in areas with more stringent rules

Strawman Rules

- Two Measures for Paved Roads
  - Stabilize access points where unpaved public roads join paved public roads
    - Gravel, chemical stabilizers, paving
    - Only applies to paved roads with 2,700 ADT or greater
    - Applies to new construction, repaving projects
    - Initial inventory of access points within the 50 km buffers
    - Annual reporting thereafter
  - Rapid cleanup of trackout, spills, and erosion caused deposition
    - Deposition extending 50 or more feet
    - Cleanup within 24 hours
- Would not apply in areas with more stringent rules

Timeline and Next Steps

- Next steps:
  - Please provide feedback on strawman rules by June 8, 2022
    - Strawman rules and 50 km buffer map posted for review under “Stakeholder Meetings” at “2021 Regional Haze SIP Planning” https://www.azdeq.gov/node/5377
    - Initial Four-Factor Determinations for Nonpoint Sources are also posted at “2021 Regional Haze SIP Planning” https://www.azdeq.gov/node/5377
- Will schedule follow up meeting if needed
- Goal to submit NPRM to SOS by late August 2022

Questions?

Questions?

Comments?

Contacts

- For Nonpoint Strawman Rule Questions or to send Feedback:
  - Bruce Friedl (friedl.bruce@azdeq.gov)
  - Alex Ponikvar (ponikvar.alex@azdeq.gov)

- For Regional Haze SIP questions:
  - Ryan Templeton (templeton.ryan@azdeq.gov)
  - Elias Toon (toon.elias@azdeq.gov)